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# Worldwide Report

ENVIRONMENTAL QUALITY

No. 294



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INCREASED ENVIRONMENTAL EFFORT IN METALLURGICAL INDUSTRY URGED

Prague SVET HOSPODARSTVI in Czech 16 Dec 80 pp 1, 2

[Article by Eng Bohuslav Moucha, FMHTS [Federal Ministry of Metallurgical and Heavy Engineering]: "On the Need to Protect the Environmental Consistently"]

[Text] Of Czechoslovakia's industrial sectors the metallurgical and heavy engineering industry has an especially important role to play in protecting the environment not only because its enterprises produce all kinds of pollutants but also because it is one of the principal suppliers of equipment which is designed to control and dispose off pollutants.

Our ministry's enterprises produce waste water with the highest content of insoluble substances, about 44 percent of the overall quantity monitored. Other indicators reveal considerably lower proportions of soluble substances, for example, only 7.5 percent, and BOD (biological oxygen demand) approximately 1.2 percent. Therefore, waste water purification aims primarily at controlling insoluble substances, thereby decreasing considerably their proportion in the effluents from enterprises to about 4.5 percent of effluents monitored from all sources in the CSSR. In contrast, up to 53 percent of the soluble substances produced are drained off with waste water. Even though these figures may appear to be rather high, they are in all cases lower than their nationwide average values.

Comparing these figures separately for the CSR and the SSR reveals that in Slovakia the proportion of controlled pollutants is lower than in the CSR both with respect to the national average and the proportion in FMHTS enterprises.

These efforts reveal the direction and problems which we must focus on most in our endeavor to improve water quality in our rivers and protect our aquifers.

In recent years several measures were adopted or are currently being implemented for the protection of water quality. Among the important measures instituted are:

--The reconstruction or construction of settling ponds in ore mining enterprises such as RB Banska Hodrusa, ZB Smolik, ZB Rudnany;

--The construction or reconstruction of effluent neutralization stations from the surface finishing or metals primarily in engineering enterprises such as Vihorlat Snina, DH Hlohovec, Skoda Pizen, VZKG Ostrava;

--Construction of waste water treatment plants for example in SES Tlmače, RB Banská Stianica, Sigma Zavadka, ZD Bohumin, VTZ Chomutov, the reconstruction of COV (waste water treatment plant) in Ziar nad Hronom;

--The utilization of treated water from the municipal waste water treatment plant in the water economy of VSZ Kosice, recirculation of waste water in NHKG Ostrava, Sroubarna Kyjov.

But by itself the implementation of these measures cannot be an objective criterion of successful protection of the environment unless the quantities of pollutants discharged are assessed. Therefore, the PMHS has introduced annual monitoring of actually discharged pollutants, so far only of those mentioned in current regulations.

It appears that since 1976 the quantity of insoluble substances discharged has been decreasing at an annual rate of 800 to 900 tons, i.e. by 4.5 percent of the overall quantity of pollutants discharged by the enterprises of our sector. In contrast, the BOD has increased. This fact can be explained by the technology of the industrial water purification plants which does not provide for biological treatment.

Due to their strongly deleterious impact on the environment, petroleum products constitute a considerable problem. From the viewpoint of water quality the fact must be faced that our sector handles each year in addition to heating oil, in excess of 200,000 tons of other oils for lubrication, preservation, etc. Moreover, these oils are used in comparatively small quantities in widely dispersed localities where no measures are being taken to protect water resources. This only increases the danger of contamination.

Therefore, we are endeavoring to focus the attention of workers involved on instituting measures which would further reduce the quantities of extracted substances in discharged waste waters below the current level of 2,500 tons annually. Already, more than 1,100 tons of waste oils are being disposed off annually by combustion, regeneration or sale.

Enterprises of our industrial sector contribute considerably to existing air pollution. In the CSR they contribute 13 percent of particulate emissions and 9 percent of gaseous pollutants monitored. The emissions come primarily from our power plants and thermal power plants. In the SSR the proportion of particulates is roughly 25 percent, and of gaseous emissions 23 percent. Aside from thermal power plants the magnesite industry and enterprises engaged in metallurgy of non-ferrous metals contribute to the emissions so that also the composition of the emissions is different.

In recent years a number of measures have been implemented to reduce primarily the emission of particulates from metallurgical and engineering enterprises.



These have included the reconstruction and modernization of precipitators at the NHKG Ostrava, VSZ Kosice, ZAZ Vamberk, Chodos Chodov, Prerovske Strojirny, RD Pribram and the assembly of new precipitators for example at TZ Trinec, VZKG Ostrava, ZB Rudnany, Skoda Rotava and elsewhere. Some projects are under construction or their operation is in preparation, for example in SMZ Lubenik, SMZ Jelsava, OFZ Istebne and in other enterprises. Some control equipment of gaseous emissions has also been installed for example at VSZ Kosice, VTZ Chomutov, NH Sered or at ZSNP Ziar nad Hronom.

But in spite of some good results achieved it must be said that considerable improvement remains to be accomplished in air pollution control. According to comprehensive data about 90 percent of emitted particulates are being controlled. This is not a satisfactory degree of control because each percentage point controlled represents 20,000 tons of particulate pollutants for which a control technology exists.

It is obvious that more attention will have to be paid to regular monitoring of pollution and the institution of control measures, especially in localities where not only air, but also water quality and other environmental elements are being affected adversely.

If pollution control results are to be substantially improved then the preparation and evaluation of all new capital investments will also have to take into account the protection of the environment. Unfortunately it must be said that the assessment of deleterious impacts of production is still only formal and inconsistent, that the conceptually and technically best available control technologies are not being applied, and that new manufactures are being allowed to come on line with unresolved or temporary pollution control provisions which then usually become permanent. In this respect all management levels and organs involved in the preparation and certification part of the capital investment process must assume a more principled and responsible attitude.

On the other hand, we know that many shortcomings in protecting air quality and water resources are also due to poor maintenance and the failure to modernize or reconstruct already existing purification installations. To raise the initiative of workers involved in this work the FMHTS introduced in 1976 competitions among economic production units, collectives and individuals within the ministry in protecting the environment and quality of life with financial rewards. Experience gained demonstrates that this approach is correct and that material incentives work and are necessary.

The upcoming Seventh Five-Year Plan will allocate considerable means for the protection of individual elements of the environment both specifically named and as part of other projects. We are obligated to prepare and ensure their optimum implementation to achieve further improvement of the working conditions and quality of life of our citizens.

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CSO: 5000



BRIEFS

ENVIRONMENTAL DEMARCATION--Attorney-General Mr. Henry Forde has said that the Government will demarcate on the east coast, Archers Bay, St. Lucy, and Ragged Point, St. Philip as an environmental area. Mr. Forde said that they will eliminate the construction of houses which would block the view of that coastline. He said a national park would be established in this area. Mr. Forde was speaking on a Resolution to approve the compulsory acquisition of land at Fitts Village, St. James, for the provision of an open window to the sea. The Attorney-General said that the Government had technical assistance from overseas countries in planning the national park. He said that Barbadians should safeguard the beauty of the east coast, which was one of the most beautiful sites in the Caribbean. He said that controlled building will go on in this area. He said that more avenues to the sea will be available to the public. Mr. Forde said that the Graeme Hall Swamp and surrounding areas should be preserved as a natural resource. [Text] [Bridgetown ADVOCATE-NEWS in English 21 Jan 81 p 1]

CSO: 5000

## BRIEFS

WATER, ENVIRONMENT AGENCY--The Division of Environment and Water, in the Ministry of Public Welfare, is to co-ordinate all agencies responsible for potable water in the entire country, Vice President responsible for Public Welfare Hamilton Green has said. With the continuous development in such areas as the Mahaica-Mahaicony-Abary (MMA) scheme and the Tapakuma Irrigation Scheme as well as many other programmes, it has become vital that a single agency take over the coordination of environmental matters, he said. Presently, water and environment are handled by several different agencies resulting in very little coordination which ultimately results in waste because of heavy duplication, he said. The new ministry is to be headed by former Regional Minister, Joshua Chowritmootoo. It is expected that Cde Chowritmootoo will be advised by an Environmental Council and the Ministry will have a Chief Environmental officer, Vice President Green said. Under this arrangement the present agencies responsible for the provision of potable water to residents and environmental matters would have a very close relationship with the Division of Environment and Water, which in turn will strive for co-ordination and singularity of purpose, he added. [Text] [Georgetown GUYANA CHRONICLE in English 27 Jan 81 p 16]

CSO: 5000

## ENVIRONMENTAL OFFICIAL REVIEWS NATIONAL REQUIREMENTS

Kingston THE SUNDAY GLEANER in English 25 Jan 81 pp 10, 20

[Article by Dr. T. E. Aldridge]

[Text]

In the Daily Gleaner's editorial of January 5, 1980, a plea was made for information to the public, on the successes, failures, and future direction of the Environmental Control Division. That plea as well as the numerous questions raised by so many sources, has reinforced our view in the Environmental Control Division, that a large number of Jamaicans are not prepared to tolerate the stench and presence of stagnant sewage, floating faeces, putrid garbage, or spreading industrial wastes that now engulf many parts of our urban and rural communities, and to our national disgrace, would identify us with those fast breeding organisms in a confined environment, which smother themselves to death on their own wastes.

To begin, the role of the Environmental Control Division should be clarified. Unlike the National Water Commission, or the K.S.A.C., or any local authority, the Environmental Control Division was not designated to carry out certain functions such as the actual construction and operation of sewage treatment plants, or water treatment plants, or the actual collection of garbage for disposal.

The Environmental Control Portfolio includes the control of: water quality for drinking, cooking, washing, swimming, irrigation, or industrial purposes; sewage; industrial wastewater; garbage and other solid wastes; chemical pollutants; pollution in factories and other working places; vectors including flies and mosquitoes; air pollution; noise and radiation. With respect to the above the Environmental Control Portfolio entails the monitoring of pollution

sources and environmental quality, determining the most cost effective ways to control pollution which affects people, livestock, crops, and natural resources, to develop environmental understanding, and to enforce environmental control standards.

### • SEWAGE, INDUSTRIAL WASTES AND WATER QUALITY

A large number and variety of sources discharge pollution into Jamaica's underground water, rivers, wells, gullies, ponds, lakes and coastal waters. These sources range from over two hundred thousand latrines or absorption pits, broken sewage pipes, faulty sewage treatment plants, to pollutants washed down during rainfall, garbage, and a variety of industrial wastes. It is these same underground water, rivers, lakes and coastal water that are the sources of water supply, that serve our own local swimmers or tourists, and which are increasingly valuable sources of fish, shrimp and other aquatic food. Water quality and wastewater inspectors, engineering, scientific, and other personnel of the division have consistently exceeded their normal duties in trying to provide even a minimum level of control in this crucial area. For example they have carried out emergency repairs to sewage treatment plants serving certain north coast hotels, in order to avoid closure at a time when Jamaica was in desperate need of foreign exchange.

The fact is however, that the level of service the Division has been able to provide in controlling water quality, sewage, and industrial wastes is about twenty five percent of requirements. One alarming example is that it is possible to carry out the most basic examination of the quality of the 1200 rural water supplies in Jamaica at a frequency of

only once per month -- and this is considered to be a high priority area!

## • ENVIRONMENTAL CONTROL AND DEVELOPMENT APPLICATIONS

Jamaica's land space is really quite limited relative to the growing population and the competing demands, and the multitude of sources of pollution. The ecological character of our country is highly sensitive, and disease can spread easily. Tragic and expensive mistakes have been made in the past such as the poisoning of the Liguanea underground water which led to a moratorium on land development on one part of the city. It is therefore in the interests of the nation as a whole that the environmental impact of proposed residential, industrial, agricultural and commercial developments be assessed carefully by competent and creative environmental personnel.

The cost of pollution is high. But the costs of delay in reviewing development plans is also significant because of inflation and other cause. In the two year period 1977-78 the Division, received and reviewed 390 applications for residential, industrial, agricultural and commercial developments. It is therefore with great concern and regret that the Division must report that the time for reviewing an application can exceed nine months as a result of the lack of manpower. Our estimate in the division is that this delay can cost the country over \$20 million in one year, can increase the cost of housing by more than 10 per cent, and adds to unemployment, and sluggishness in the construction industry. It is very ironic that the cost for eradicating this problem is a small fraction of the \$20 million.

## • OCCUPATIONAL POLLUTION, AIR POLLUTION, AND NOISE POLLUTION

The division has prepared programmes for tackling the surprisingly large number of problems in Jamaica with respect to occupational pollution, air pollution, and noise pollution. Action has been taken on specific problems such as the stoppage of tanker drivers associated with air pollution in Hunts Bay, and a number of other problems.

However we have not been able to respond to more than about 25 percent of the country's needs.

## • NATURAL AND MAN-MADE DISASTERS

In 1979, and 1980 the Division was heavily involved in assessing and responding to water quality, environmental sanitation, drainage, and other environmental problems which accompany natural disasters such as flooding, hurricanes, and earthquakes. The Division is also actively involved in the preparation of national, and Regional plans to combat major oil spills in the Caribbean, the kind of disaster which could wipe out a large part of the fishing industry and virtually eliminate tourism in a matter of a few hours.

The piles of stinking garbage, refuse, and other solid wastes in markets, streets, yards, gullies, open lots, and dumps of the Kingston Metropolitan Region bears loud testimony to the fact that the Division has had very little success in relieving one of Jamaica's most disgusting and serious environmental conditions. In 1977 however, the Division made proposals for managing garbage and other solid wastes in the Corporate Area and subsequently played a major role in the National Planning Agency's Solid Waste Management Study for the Kingston Metropolitan Region. The division has also carried out studies for the management of solid wastes in the rest of the island. The division has helped to select and evaluate sites for sanitary landfills for Kingston garbage and for Kingston garbage and for other parishes, as well as conduct training courses for local authority personnel in solid waste collection and management.

## • ENVIRONMENTAL TRAINING AND INFORMATION

In a few years the Environmental Control Division has developed a remarkable record for upgrading the skills and knowledge of persons involved in environmental field in one way or the other. Since 1976 and in conjunction with the College of Arts Science and Technology, and in varying degrees of association with other Government Agencies such as the National Water Commission, the West Indies School of Public Health, and the Ministry of Health's Training Division, and the Ministry of Local Government, and with the assistance of the Pan American Health Organization, the Division has co-ordinated advanced training for over 350 Public Health Inspectors, Technicians, and Operators from Jamaica and other territories in the Caribbean Region.

In 1979 the Division initiated a Certification Programme of international standing

for Operators of Water Treatment Plants. In 1980 the Division put on the first ever training course in Jamaica for maintaining the safety of swimming pools in our hotels. In 1979, and 1980 the Division conducted the first ever courses in the Region in environmental quality monitoring and assessment for Planners, Scientists, Engineers, Public Health Inspectors, and Technologists and others. We have also assisted the Ministry of Local Government and the Parish Councils in other training activities.

## • ACCOMPLISHMENTS VERSUS NEEDS IN CONTROL

As important as accomplishments are, it is our view that what Jamaica needs for effective environmental control, is at least as important. The social and economic cost to Jamaica from inadequate environmental control is already appalling. The future potential costs are staggering, and indeed terminal to our national aspirations because environmental quality affects agriculture, construction, energy, health, housing, industry, tourism and other substantial areas of national concern. Thus while the constraints under which the Environmental Control Division has tried to work since 1975, would shock the nation, the disturbing truth is that accomplishments amount to no more than 50 percent of what the country needs, deserves, and appears to be demanding. Moreover in the past twelve months the Division has been hit so hard by the lack of personnel and resources, that Jamaica is now in a serious crisis of environmental management, at a time when it can least afford to be.

## • STRUCTURAL WEAKNESSES IN MANAGEMENT

The attachment of the Environmental Control Portfolio to what was intended to have been a combined Ministry of Health

and Environmental Control was simply an experiment that failed disastrously. Health is a Ministry ridden with organizational anachronisms, crippled with conflicts among categories of personnel, and stubbornly resists enlightened changes. The Ministry does in fact get less of the national budget than a Health Ministry deserves. During the past five years the power elite in Ministry have been for the most part, quite likeable individuals, but their comprehension and interest in Environmental Control has been abysmal. Even after the temporary transfer of the Environmental Control Portfolio at the end of 1976, incredibly the crumbs given to the division from the Ministry's budgetary table amounted to about two-thousandths of the Ministry's budget.

A second weakness in Jamaica's arrangements has been the attachment of the National Resources Conservation Department to the Ministry of Mining and Natural Resources, now Mining and Energy. Despite the limited successes of the Natural Resources Conservation Department, the arrangement is simply one of conflict of interests, and conflicts in the organizing of interests.

A third weakness was that opportunity was not taken to establish Environmental Control as a statutory self supporting enterprise. There is absolutely no doubt that Environmental Control is function which if creatively established could reduce inflationary increases in housing costs, to the benefit of all concerned.

A fourth related weakness is manpower. Jamaica has not been entirely realistic in dealing with the international competition for Environmental Engineers, Scientists, and Technicians. Nor have we given sufficient attention to developing Environmental Technologists at the College of Arts Science and Technology, and upgrading Public Health Inspectors whose work is mainly environmental, and organizing them more effectively both in central government and in the local authorities.

## • FUTURE DIRECTION OF CONTROL

Environmental Control and the wider area of environmental management in Jamaica can be rescued from the present shambles of neglect by creative restructuring at central and local government levels. There is so much to gain by transforming the Environmental Control Division into an effective self supporting statutory Environmental Agency preferably with the Natural Resources Conservation Department brought in, so as to improve efficiencies. Parish environmental work could be advanced immensely by organizing the existing Public Health Inspectors, who are basically environmental personnel, into Departments for Environment and Food Sanitation, headed by Chief Inspectors.

For the proposed central statutory Environmental Agency built from the present Environmental Control Division and the Natural Resources Conservation Department, one appealing and logical development would be a Ministry of Local Government and Environment which already has the National Water Commission, and is closely linked to the local authorities. A more ambitious and far reaching alternative would be the creation of a Ministry for Environment by bringing together the proposed Environmental Agency, and bodies such as Town and Country Planning Authority, Survey Department, Forest Departments, Titles Office, Natural History, Natural Spas and Baths, Public Gardens, and the National Water Commission.

The future direction of Environmental Control will depend on whether we do care about the survival of our nation.



## WORK OPERATIONS AT NATURE PRESERVE IGNITE OPPOSITION

### Simla Quarrying

Port-of-Spain TRINIDAD GUARDIAN in English 20 Jan 81 p 5

[Text]

NATIONAL Quarries Company has denied that it is conducting operations at Simla, a nature and wildlife station in the Northern Range. Dr Keith Rowley, senior executive at the State-owned company, said yesterday his company had nothing to do with quarrying operations at Simla, but at Valencia.

Dr. Rowley said "In fact, we are setting good examples of quarrying practices."

Field naturalists and wildlife lovers have protested to Government about the bulldozing of the wildlife station, in the Arima-Bianchouse area, reputed to be one of the best centres for research for scientists in the world.

Mr Errol Mahabir, in the Ministry of Finance, with responsibility for Energy, has called for a report by tomorrow on the bulldozing of the nature reserve.

Mr Selby Wooding, S.C., sent a strong letter of protest to Mr. Mahabir, pointing out the value of the area and,

requesting that destructive activities cease immediately.

According to a Government source, the bulldozing was being done to provide aggregate for the National Secondary Roads Development Company to carry out the construction and improvement of roads.

### Criticism of Government

Port-of-Spain TRINIDAD GUARDIAN in English 23 Jan 81 p 7

[Text]

NATURALISTS have accused Government of mindlessly stealing and raping vital natural reserves and ignoring the need for conservation legislation.

Naturalists and wildlife lovers lodged strong protests at "the latest rape" of Simla the nature station in the Northern Range, which belongs to the Asa Wright Nature Centre.

Mr Stephen Mohammed, editor of the Trinidad Naturalist Magazine, said the bulldozing of land at Simla showed Government's lack of serious conviction for conservation.

He pointed out that in other parts of the world, governments were seriously attempting to preserve their environment, yet here in Trinidad nothing was being done to protect some of the

world's richest natural reserves.

Mr Colin Laird, President of Eco One, a group concerned with ecology, pointed out that in the past, attempts to stop destruction of reserves were not heeded by Government.

### ALWAYS BEATEN

"The problem is that there are always issues coming up. We always get beaten on

them and the areas go unsaved."

He listed areas which had been destroyed by Government projects, including Cronstadt Island, San Fernando Hill, and Lady Young Road.

Mr Ian Lambie, President of the Asa Wright Nature Centre, said up to Tuesday bulldozing operations were going on at Simla by Conrad Transport and Contractors, Limited.



He said there were other areas in the country where aggregate for the Secondary Roads Development Plan could be had, but Government had chosen the Simla site to start its digging.

The naturalists are calling for legislation which will protect natural resources. Mr. Mohammed has prepared a document which proposes guidelines of a conservation Bill.

Executives from Conrad Transport and Contractors Ltd. could not be contacted. Proposed name for the committee to press for a conservation Bill is the National Lands Conservation Committee of Trinidad and Tobago.

### Ministry Probe

Port-of-Spain TRINIDAD GUARDIAN in English 4 Feb 81 p 3

[Text]

ENERGY and Energy-based Industries Minister, Mr. Royel Mahabir, headed an investigative team to the Asa Wright and Simla Nature Centres, Blanchisseuse, including an area where German workers are doing excavation work, last weekend.

The team, which was greeted on arrival by Dr. Joseph Capeland, Vice President of the Asa Wright Nature Centre, and President Ian Lambie, agreed that work could not be more injurious to the environment than work previously undertaken.

Mr. Mahabir reiterated that the appointed team would work together with the Asa Wright Society, not only to monitor quarrying on the spot, but in the entire Verdant Vale area, so as to pre-

serve the ecology and surroundings.

The team and the Board of the Asa Wright Trust have been asked to identify areas in the Blanchisseuse Valley which should be left alone for research.

The team included Mr. Overend Padmore, Minister in the Ministry of Finance, Mr. Kamaluddin Mohammed, Minister of Health and Local Government, Mr. Peter Samuel, Commissioner of

Lands, Mr. John P. Scott, chief geologist, Dr. Keith Rowley, Manager of National Quarries, Mr. Alick Jordan and Mrs. Lynette Stephenson, Senior State Counsel in the Ministry of Energy and Energy-based Industries.

The Minister felt that in view of the good work done there, Government should be urged to give assistance to the station and improve its present run-down state.

CSO: 5000

## TRINIDAD AND TOBAGO

### BRIEFS

**WILDLIFE PENALTIES**--Mr. Abdool Aziz, President of South Trinidad Hunters' Group, is calling on Government to amend the Wild Life Ordinance, to impose harsher penalties. Mr. Aziz said yesterday penalties were too lenient, and people continued to break the law. Among offences, he explained, were hunting during the closed season. Hunting protected animals and in game sanctuaries, [as published] He said, too, the Minister of Agriculture should review the list of honorary game wardens. [Text] [Port-of-Spain TRINIDAD GUARDIAN in English 21 Jan 81 p 6]

ChOI 5000

## MINISTER DISCUSSES REFORESTATION, SOIL PROTECTION ACHIEVEMENTS

[Editorial report] The French-language daily LE RENOUVEAU DU BURUNDI published in Bujumbura recently ran a series of press interviews with various officials: "Application of Resolutions and Recommendations of the First National Congress of the UPRONA [National Unity and Progress Party]." In installment XIII, "Agriculture and Animal Husbandry Sector," which appeared on pages 1-4 of the 14 January 1981 issue, Minister of Agriculture and Animal Husbandry Etienne Baradandikanya discussed progress and plans in fields under his jurisdiction, and then answered the following question:

[Question] We have witnessed a progressive deterioration of the soil and an invasion of tillable and pasture lands by houses as a result of our galloping demography. Do you not feel that this will lead to restrictions on food production? How do you plan to remedy this?

[Answer] We have paid great attention to reforestation and to protecting the soil.

### A. Reforestation

We have set aside 22,000 hectares for firewood and 10,000 hectares for timber.

### B. Soil Protection

The soil protection consists of a series of actions including protection of the natural forest (Bururi-Taza-Kayanza) by establishing an afforestation belt covering the needs of the population; protective afforestation for the 6,000 hectares on the Mugamba crests and 4,000 hectares on the Kayongozi-Ruvubu crest; and fighting erosion by anti-erosion trenches for 200,000 hectares on the sides of Mimirwa, of Mugamba, and of Bututsi.

In this area, the achievements are as follows: For reforestation, it is to be noted that from 1976 to 30 November 1980 10,636.30 hectares were planted, that is, 3,025.09 by the State, 1,480.05 by the communes, 151.26 by community effort, and 4,000 by families on their own property.

As for the digging of anti-erosion trenches, we estimate a maximum of 44,000 km of trenches which corresponds to 90,000 hectares of soil protected against erosion.

CSO: 4400

## AGRICULTURE IN CENTRAL REGION AFFECTED BY FLOODS

Maputo NOTICIAS in Portuguese 15 Feb 81 p 2

[Text] Beira (Delegation)--Heavy rainfall in recent weeks in the province of Sofala and upstream along the rivers are the direct cause of the increase in the flow rate of the Zambeze, Pungoe and Buzi. The latter two rivers spilled over their banks at various points, causing destruction to crops and some sections of highway, a situation which can get worse in view of the fact that heavy rainfall continues to be recorded in that region.

As of last Friday, the Pungoe ran 7.39 meters high (about 4 meters above its normal level) and caused flooding of sugar cane plantations (in Mafambisse) and on National Highway No 6 where it seriously threatens regular traffic.

According to reports, if the rainfall rate of the past 2 weeks persists in that zone, the situation should reach the proportion of the 1976 rainfall when the highest level of the Pungoe River was 8.40 meters.

On the other hand, it was learned that the waters have already flooded a large part of the 80,000 hectares of the banana cultivation project in Metuchira where a team of Brazilian and Mozambican technicians is currently conducting probing operations in the field.

Along the highway section between the little towns of Pungoe and Tico, traffic is encountering many difficulties, especially regarding gasoline-powered motor vehicles since the water has already reached a height of 55 centimeters (above road level).

### Situations Along Buzi and Zambeze

As we have been able to ascertain, rainfall along the Buzi caused various damages to plantations in the sugar-growing unit in that district and also in some population settlements as well as access roads.

Along the Zambeze however (as of yesterday), the situation does not yet seem critical; it must be reported that the large barge used in crossing the Grande River between Chupanga (Sofala) and Mopeia (in Zambezia) has been out of operation for several days now.

It must be emphasized that the ground is quite bad whenever it rains both in the Inhamitanga--Chupanga section and in the section running from the ferry station (in Zambezia) all the way to Mopeia, both sections becoming impassable.

#### Situation in Beira

It has been raining almost without interruption for several days now in the provincial capital of Sofala; this has caused floods in the surrounding areas and in some sections in the city itself (as we know, Beira is rather swampy and is below sea level).

In addition to having caused damage to homes in the suburbs, the rain water also destroyed some plantations operated by the people.

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## BRIEFS

**ZAMBEZI RIVER FLOODS**--Beira (Delegation)--More than 3,000 hectares of cotton land were devastated by the waters of the Zambeze River in the district of Tambara, province of Manica, due to the rise in that river's water level. According to sources linked to that district's Executive Council, one person lost his life in the little town of Sabeta when he was swept away by the current of this big river. The same source also informed us that corn was the crop that was most seriously hit by that natural calamity since the plantings of that crop can no longer be used. An identical situation can be observed along the Muira, Nacafula, and Eponpue Rivers, likewise in Tambara, where family plantations as well as collective plantations, precooperatives and state cooperatives were hit by the rainfall due to the rise in the level of those rivers. On the other hand, the people in the little town of Macossa, district of Barue, are facing the same difficulties since most of the collective plantations in that part of the province, especially in the low-lying areas, were devastated by the rainfall which came down with considerable intensity in that region. In Macossa, the situation is difficult because the local population last year was facing starvation problems due to the drought which had hit that area. We cannot as yet supply any precise data on the Revue River in the district of Chimoió but it is known that the water level is rising there; this has caused the SHER (Hydroelectric Power Company of the Revue) to open the sluice gates of its dam. [Text] [Maputo NOTICIAS in Portuguese 18 Feb 81 pp 1, 4] 5058

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# SENATOR URGES LIMIT ON USE OF RESOURCES

Kaduna NEW NIGERIAN in English 17 Feb 81 p 7

[Article by Bala Dan Abu]

[Text] THE Chairman of the Senate Committee on Petroleum and Energy, Senator Ahmadu Ali has called for moderation in the disbursement of the nation's economic resources.

Contributing to the debates on the general principles of the 1981 appropriation bill, Senator Ali noted that although the outlook for Nigeria's oil industry was bright, there was need for caution in view of the uncertainties that lay ahead in the world market of crude oil sales.

He said that as a country whose economy was heavily dependent on crude oil, Nigeria could not ignore certain events taking place in other parts of the world in connection with the world's energy equation.

Some of these events, according to Senator Ali, included the United States' de-control measures under President Ronald Reagan and the falling price of spot crude oil.

These, he said, were signals of an impending depression in the demand for crude oil.

Senator Ali also stated that with the Iran/Iraq war gradually ending and the eventual lifting of trade sanction against Iran following the release of the American hostages, the traditional buyers of Nigeria's crude oil were bound to divert attention from our type of crude oil to that of Iran.

These developments, Senator Ali explained, meant that the demand

for our crude oil would not go at the rate the nation would expect. He therefore called for careful spending of the nation's oil revenue.

Senator Ali commended the efforts of President Shugu Shagari in increasing Nigeria's external reserves in the past one year and for wiping out our domestic deficit for 1979.

By these achievements, Senator Ali noted, President Shagari had demonstrated 'in no uncertain terms that he can grapple with our economic problems effectively.'

He urged the Federal Government to encourage indigenous manufacturers, adding that there was need for the government to embark more on manufacturing rather than merely assembling other country's products.

Senator Ali pleaded with the National Assembly to allow President Shugu Shagari the free hand to vary his fiscal measures within certain parameters through executive orders as a means of effectively dealing 'with the confusion that has plagued our economic policy in the past years.'

## BRIEFS

ACUTE ABEOKUTA WATER SHORTAGE--Acute shortage of water has hit Abeokuta, the Ogun State capital for the past three days. Many residential areas in the state have been without water for their domestic use. Housewives, school children and others have therefore resorted to brook and well waters for their domestic needs. Meanwhile, the Alake of Egbaland, Oba Oyeade Lipede, has expressed great concern over the shortage of water in the town. The Oba urged the State Water Corporation to do its best to prevent an outbreak of water borne diseases in the town which, he said, could happen if people relied on brook and stream waters for domestic uses for too long. Oba Lipede made the remark at a meeting he held with the new General Manager of the state Water Corporation, Chief Adekunle Popoola, who said water supply to the state capital would be increased by 1.4 million gallons per day in May this year. At the moment, he said a total of two million gallons of water was being produced daily for the people of the city. He explained that distribution of water produced at the Ibereodo Water Works became more arduous, last week as a result of power failure. The general manager told the Alake and his chiefs that his corporation would introduce a policy of having two heavy duty generators in each of all the 21 water supply schemes throughout the state this fiscal year. [Text] [Kaduna NEW NIGERIAN in English 21 Feb 81 p 9]

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## CONTINUED USE OF DDT REPORTED

Salisbury THE SUNDAY MAIL in English 22 Feb 81 p 4

[Text] **DESPITE** a growing shift by commercial cotton growers away from use of DDT, the controversial pesticide will probably continue to be widely used in Zimbabwe unless new low-cost alternatives were developed, Government and pesticide industry officials said last week.

Environmentalists concerned about the pesticide's long-term effect on wildlife and many recently had their hopes raised when a Cotton Growers' Association spokesman said the commercial growers would phase out use of DDT within five years.

But while commercial growers were among the biggest users of DDT they were not the only ones, the officials said.

**TSETSE FLY**

Up to 310 tonnes of the pesticide could be used this year for tsetse fly control, about 90 percent of it in the north-west portion of the country where game was common. Another 140 tonnes a year was used in the Government malaria control programme.

And a potentially huge user was the peasant farmer. Spurred by Government efforts to bring him into the cash economy, the peasant farmer had put an estimated 40 000 ha of tribal land into cotton production this year, an increase of 180 percent over last year.

Commercial farmers, by comparison, had about 60 000 ha in cotton.

**ESTIMATE**

Agriculture has long been the biggest user of DDT, but the Ministry of Agriculture would not disclose how much of the pesticide was being used in either the commercial or peasant cotton farming sectors.

Various officials estimated that 90 percent of the commercial growers had already switched to Endosulphan, a much more expensive pesticide with the advantage of sparing the natural predators of the red spiker mite. During the years DDT had been used it killed the mite's predators and thereby encouraged the pest's growth.

No one contacted by the Sunday Mail would hazard a guess as to the quantity

of DDT being used on tribal land, but officials with the Department of Agricultural Development (Devag) said that peasant farmers were not being encouraged to use DDT.

"There was not a single gram of DDT in any of the crop packs distributed during the recent resettlement exercise, nor was there any reason for there to be. There are good options to DDT," said Mr Peter Silk, principal agronomist with Devag.

"Carbaryl mixed with molasses on site at the time of planting is quite effective.

Another crop scientist working with cotton said that the qualities that originally made DDT popular with farmers throughout the world — low cost and a reputed low toxicity to humans — made it a logical choice for a farmer working a small plot with meagre capital resources.

**CHEAPEST**

"It's a matter of economics. The peasant farmer wants the cheapest insecticide possible and DDT is by far the cheapest. Endosulphan, the insecticide to which most commercial farmers have switched costs almost three times as much," he said.

"And Endosulphan is also much more dangerous to use. DDT is one of the safest pesticides to handle."

DDT, hailed after the Second World War as a miracle pesticide, has been the subject of controversy since the 1960s when it caused the extinction of several species of birds in North America.

Its chief drawback is that its compounds are virtually indestructible. They remain active in the

environment, gradually working their way up the food chain and becoming concentrated in the "top of the chain" birds.

In Zimbabwe, evidence of the pesticide's harmful effects has not been considered conclusive, but officials with the Department of National Parks and Wildlife Management have repeatedly warned that it could eventually lead to the extinction of many of the nation's predator bird species.

"We can not be lax in this matter because there is a threshold of decline that, when reached, is followed very rapidly by the extermination of the species," said Mr. Ron Thomson, provincial warden for Mashonaland South.

#### RESTRICTED

"We have seen this happen with the peregrine falcon in the United States and it very nearly happened to the peregrine in Britain. Fortunately, DDT use was severely restricted in the U.K. before the threshold for that particular species was reached there."

Many species of birds in Zimbabwe were either at or very near their threshold of extinction.

"Unfortunately, for all the talk of DDT's potentially harmful effects we seldom get a serious effort to move to an alternative unless the alternative is more attractive (to the users) than DDT," he said.

#### HIGH LEVELS

"The cotton growers only switched to Endosulphan because DDT destroyed so many of the red spider mite's predators that the pest which had only been a nuisance before, became almost as much of a pest as the bollworm."

The United States, Sweden, Canada and South Africa have all banned DDT.

Tests made a decade ago showed that Zimbabweans had higher levels of DDT compounds stored in their bodies than in any nationality. But in the absence of conclusive evidence of its harmful effect on man, no action has been taken to ban it.

## CENTRAL ASIAN TEST SITE PREDICTS EARTHQUAKES

Moscow MOSKOVSKAYA PRAVDA in Russian 25 Dec 80 p 3

[Article by V. Melik-Nubarov: "Earthquake Forecasters"]

[Text] Test site is an alerting, warning word that tests are being conducted here, something new is being developed, and that the master here is science, involved in exploration. Fences are seen, strict warning signs, the atmosphere is one of intense work, errors, findings and possible danger. But the test site that we would like to talk about is practically impossible to enclose. Warning signs are simply not necessary here. All the rest holds: science is conducting exploration. The test site extends for tens of thousands of square kilometers, including the cities of Frunze and Chollon-ata, Garm and Andizhan, Chuyskaya and the Fergana valley. And this is far from the entire territory. It will grow and grow, covering oblasts and republics until it spreads to all the seismically-dangerous sites in the country.

We cannot list all the hosts of this unusual test site since there are so many organizations participating in the experiment and interested in the results. But the bosses here are the Moscow scientists, representatives of the Institute of High Temperatures, the O. Yu. Schmidt Institute of Earth Physics, and the I. V. Kurchatov Institute of Atomic Energy. The scientists are armed with magnetohydrodynamic units of unusual power and the most advanced equipment for obtaining and processing information. This information is from many kilometers in the depths of the earth. On the enormous territories the equipment of the test site is hardly noticeable. But the magnetohydrodynamic generators are actuated once every 2 weeks. The plasma formed by the explosion is carried through the magnetic field, while the powerful impulse of electromagnetic energy that appears enters the earth. An electromagnetic wave penetrates its crust to a depth of 20-30 kilometers. In moments, it spreads tens of kilometers where it is awaited by recording devices of the reception stations. Information about the electric properties of the earth's crust is the quantity of its apparent electric resistance. If it is the same from time to time, then this means that it is quiet underground. If it changes, this means that the conditions in the depths are changing. The stress of the strata is rising. This can result in a shift, a fault, causing the earth to shudder and shake, the chandeliers in houses to swing and the dishes to tinkle in the cupboards. The women bustle about, pushing the children out the door, farther from the possible tragedy. The Moscow scientists are working in Central Asia so that there will never be a tragedy and in order to remove the unexpected aspect from earthquakes. Changes in the instrument readings begin 2-3 months before an underground catastrophe. They indicate the possible strength of the future shocks. This is quite enough to take the necessary measures.

The method of electromagnetic exploration passed the test at the Khazor-Chashma station in Pamir. Here the unit "Pamir-1" was regularly actuated in the center of the Garm geophysical test site. The signals it sent were recorded at six reception stations located around at a distance of 35-40 kilometers. The instrument readings were carefully compared. If the electric resistance begins to change and diminish at one of the reception stations, then the epicenter of the future, already expected earthquake will be near it. The results of the experiment proved that the physicists are on the right track.

The scientists are not only probing the earth with electromagnetic waves. They are trying to find factors that change synchronously with the changes in resistance of the earth's depths. It is possible that these are changes in water level, changes in movement of the earth's surface determined by geodetic methods, changes in the rate of spread of compressional waves in the earth's crust, and much more. The link between them and the imminent earthquake has almost been found. The growing strain in the depths in some way still appears on its surface. It has been noted that animals are disturbed before strong earthquakes. The searches continue.

While the scientists are developing and testing new and more powerful magnetohydrodynamic units, accurate and sensitive equipment to catch the signals passing through the earth's depths, they are planning a whole set of measures to predict earthquakes that will help to verify the readings of the magnetohydrodynamic generators. Work is also underway to perfect the generators in whose channels colossal temperature fluctuations occur and to automate the experiment and create radiotelemetric systems for collecting and processing the geophysical information.

The geologists mastered the method of electrical exploration of the depths to tens and hundreds of meters long ago in searching for minerals. But earthquakes cannot be predicted with them because they begin much deeper. For the electromagnetic impulse to penetrate there, it must be especially powerful, tens of megawatts. These powerful generators have been developed in the Institute of Atomic Energy. The task of the Institute of High Temperatures is to guarantee the viability of the idea and to create magnetohydrodynamic complexes for electrical exploration of the earth, and make the design of the generators reliable, stable in operation, and the entire complex both efficient and economical. It is no small task. But it can be called the minimum task. The maximum is the final goal that you are already acquainted with, to turn all the seismically dangerous territories of the country into a test site of earthquake prediction.

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# NAVAL OFFICER COMMENTS ON STATE OF WATER POLLUTION PREVENTION

Moscow KRASNAYA ZVEZDA in Russian 27 Dec 80 p 2

[Article by V. Danilov, engineer-captain third rank: "The Sea Becomes Cleaner"]

[Text] The people of Sevastopol' observed this picture several years ago. A flock of white swans, tired after a long migration, stopped to rest in one of the quiet inlets. It proved to be uncomfortable and unwelcoming for the birds. The wind blew mazut, solar oil and gargabe there. The birds hurried into the sky, but not all of them could take off immediately. They got to the shore with difficulty, and on the sand spent a long time drying and cleaning their feathers. They say that since then swans have not been seen in these areas anymore.

Quite recently I had to be on the shore of this same inlet. It was clean. The blue mirror of water reflected the sun and clouds. Now I wanted to say: "Return white swans!"

Our seas are really becoming cleaner. This is natural. In recent years the party and government have focused special attention on environmental protection.

An entire section is dedicated to environmental protection in the recently published draft of the CPSU Central Committee for the 26th Party Congress. Specific tasks were set here for further intensified struggle for a prudent attitude to nature.

These tasks have the most direct relationship to us, naval sailors. We are obliged to make our contribution to environmental protection.

A lot is being done. In recent years, the number of oil collecting ships in the fleet has risen. The equipping of the combat vessels and ships with the most diverse technical attachments to prevent discharge of petroleum products into the sea has been improved and continues to be perfected. The fleet efficiency experts are working actively in this direction. On one of the small antisubmarine vessels, for example, a group of sailors led by engineer-captain third rank V. Pegushin designed and put into operation an original, reliable unit for water purification from petroleum products. On the hydrographic ship where T. Kostyukovich is a captain, a shipboard system of collecting bilge and waste water has been developed and introduced.

I could continue the list of such examples. But the draft of the CPSU Central Committee for the 26th Party Congress directs us not to be content with what has been done, but to search for new reserves of further intensification of the struggle for cleanliness of the sea.

These reserves exist. Although rare, unfortunately, cases still occur where due to someone's negligence or inefficiency prerequisites are created for pollution of roadsteads, harbors and inlets. Such phenomena are generally decisively combatted and the guilty are strictly punished. But at times this is done long after the events.

We evidently need to pay more attention to prevention of sea pollution. Here we cannot do without systematic and purposeful education of the sailors in the spirit of love for the sea and personal responsibility for fulfillment of the requirements of the USSR Constitution, and the decrees of the party and government, and ship charter of the USSR Navy on environmental protection.

Another important reserve is contained in the further improvement of the technical support of work for preventing pollution of the sea. The time has come, in my opinion, to be seriously engaged in creating special shore stations, and perhaps even plants, for the collection and processing of bilge and waste water. Such a plant is currently being built in our fleet at accelerated rates. The specialists have computed that it not only will promote the clean state of the water area, but also yield a definite economic effect. I suggest that the creation of stations for processing bilge and waste water be stipulated in the draft of the CPSU Central Committee for the 26th Party Congress.

Protection of the sea, like nature as a whole, is a complicated matter. It is very true that the draft of the CPSU Central Committee for the 26th Party Congress plans to develop work "to perfect the state control over use of nature and environmental protection." This perfection is necessary because overlaps often still develop. It happens that the ship commander or head of the fleet enterprise is approached by a dozen representatives of different environmental protection agencies. This diffuses forces and diminishes the efficiency of the environmental protection measures. In my opinion, centralized control should be one of the means of perfecting state control over the use of nature and environmental protection. This should also be introduced into the draft of the CPSU Central Committee for the 26th CPSU Congress.

The party is making the greatest plans for further advance of our country towards communism. A lot is planned for the field of environmental protection. This means that with time our seas, our wealth, and our health will become even cleaner. They will serve people even better. This means that the white swans will return to the quiet inlet.

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## ANTIPOLLUTION EFFORTS IN LATVIAN PORT

Riga SOVETSKAYA LATVIYA in Russian 29 Nov 80 p 2

[Article by A. Osipov, senior inspector of the republic state inspection for water protection of the Baltic Sea: "Clean Gates to the Baltic"]

[Text] The sanitary condition of the Baltic sea ports depends to a considerable degree on the organization of treatment work. The experience of the Liyepaya fishing port is confirmation of this. A specialized subdivision was set up here which included a number of technical apparatus, oil and garbage collector, bilge water collector, floating barriers, etc.

This subdivision monitors the condition of the port water area every day and organizes daily cleaning of it. The arriving vessels are given a mandatory decree by the port authorities. In addition to stating the customs of the port, it indicates the special requirements for preventing pollution of the water area. The representatives of the port inspection seal the outboard valves of the ships.

When the ship leaves the port, the port inspection checks the integrity of the seals on the discharge valves, while the captains give the sanitary-quarantine department a report on release of all types of pollutants. The port dispatcher has the address of the crew of the oil and garbage collector to call its members in the evening and on days off in case of an accidental oil spill.

When petroleum products are spilled in the ports, it is especially important to have timely notification of the head of the specialized subdivision to take measures to localize and collect the spilt petroleum products. The Liyepaya port has developed a plan of notification that the dispatcher keeps. Special training was given to eliminate a conventional oil spill.

All of this taken together makes it possible to maintain the cleanliness of the water in the Liyepaya port.

Unfortunately, this port is not yet sufficiently supplied with equipment for taking from ships the petroleum wastes, waste water and garbage formed during their operation. The available floating treatment plant NNB-14 does not satisfy the very minimum requirements.

A reception reservoir was constructed last year to collect the polluted water of the port, but it was not connected to the municipal treatment works for a long time

at the fault of the OKS (department of major construction) of the Līepāja gorispolkom. For this reason, a temporary technological plan was introduced into the port for removing fecal water from the ship to a sanitation machine with subsequent removal to the municipal treatment works. However, the leadership of the Latvian production association of the fishing industry transferred the sanitation automatic machine designed for the Līepāja port to the Ventspils Fish Canning Plant.

In the second quarter of this year, the Līepāja port was to obtain a collector of bilge, waste water and garbage, but by the instructions of the USSR Ministry of the Fish Industry, it was decided to transfer this plant to the Tallinn port. Consequently, the production association "Latrybprom" had to find other possibilities for supplying the Līepāja fishing port with the necessary equipment.

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# AUTOMATIC STATIONS MONITOR RIVER POLLUTION

Moscow PRAVDA in Russian 14 Dec 80 p 6

[Article by L. Lebedev, special correspondent of PRAVDA: "Post at the River"]

[Text] In Rostov-na-Donu, in the Hydrochemical Institute of the USSR State Committee on Hydrometeorology and Environmental Control, jointly with a number of enterprises and organizations, automatic stations have been developed for observing the condition of surface waters.

I will supplement this report with the following picture. Imagine an empty river bank. For several kilometers around there are no houses or even a fishing camp site. Suddenly a turbid wave rolls into the clean stream of the main channel from the tributary. Somewhere the treatment works of an enterprises were not actuated, or a downpour washed part of the just applied chemical fertilizer from the fields. Downstream is the water intake of the nearest city. If the hydrochemists do not find the harmful admixtures in the water in time, it looks at though it will begin to enter the tapwater network. But the water intake was closed in time, even before the laboratory workers of the city water supply made the next analysis. Who gave the signal about the adversity in the river? It came from a small box on the empty shore near the tributary mouth. The automatic monitoring station located here immediately found the increased content of harmful contaminants in the water.

"These stations are capable of fulfilling several assignments. They are both observers and chemical laboratories, and unique clocks that rapidly give a signal if there is something adverse on their section," says the director of the Hydrochemical Institute, Professor Anatoliy Maksimovich Nikanorov.

The station that is installed on the shore periodically takes water samples without human help, analyzes it, codes the results and transmits them to a zonal center of information processing equipped with a computer. If undesirable substances appear in the river and their content exceeds the permissible concentrations, then a signal to this effect is sent immediately, in any weather, day or night. The station simultaneously takes a new sample of water and saves it for more complete laboratory analysis. The most important aspect of course is that the system of stations will permit rapid detection of the pollution source and the necessary measures to be taken.

"We began to make the automatic stations of water pollution monitoring long ago. They have them abroad and in our country, for example, on the Moscow River. Now



the second phase of stations is already being installed on the main water artery of the capital region, and they are being installed on the Neva. But the fact is that they previously could only make chemical analyses of water for 6-8 indicators. The stations of the new, second generation that will be tested in the near future, use 17," relates Nikanorov.

It is understandable that in the laboratory, so to speak, one can "manually" make a much more thorough analysis. But you will hardly organize laboratories, much less with a broad staff of colleagues at each observation point. And there is no need for this. The automatic station can be set at any regime, and it will report all the necessary data every 15 minutes, hour or several times a day.

Here it is important to note the following aspect. The stations not only permit rapid detection of the cause of water pollution and take measures to eliminate it. They have a "psychological effect" on the negligent managers. The objective and constant monitoring forces them to have a serious attitude towards the creation and operation of treatment plants. The automatic machines do not allow anyone to innocently shrug their shoulders or "plead uncle." The guilty party becomes clear immediately.

"By the way, did you see the boxes with equipment in the corridor of our institute?" asked the professor. "This is the beginning of equipment for a new type of station. Specialists from Leningrad, Tbilisi, Kazan', Nal'chik and Novocherkassk participated in its creation. Now the problem is that there is nowhere to install it."

The second generation of systems should be placed on the Don from Volgograd to the mouth of the river, and be "broken in" here. The decision to make this system was made 2 years ago. However the general customer, "Rostovoblvodokanal" has not yet even issued an order to design the zonal center for information processing.

Not only the residents of the Rostovskaya Oblast are interested in making the automated system for monitoring water pollution in the Don. A type of all-union test site should be set up here where analogous systems, in passing the testing will obtain directions for other rivers in the country.

A map hangs in the office of the director of the Hydrochemical Institute. It is scattered with numerous signs as if it had been sprayed with different color ink by playful students. These are marks of the hydrochemical and hydrological points for observing the condition of the water. There are over 4,000 in the Soviet Union. All the information coming from them is still processed according to the old method. The broad use of automatic stations and monitoring systems for pollution of surface waters will guarantee the efficiency of the actual monitoring. According to an evaluation of the scientists, it will increase 30-fold with the same expenditures.

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## MONITORING OF AIR POLLUTION DISCUSSED

Frunze SOVETSKAYA KIRGIZIYA in Russian 23 Dec 80 p 2

[Article by G. Yar-Mukhamedov, Chief of the Kirghiz Republican Administration for Hydrometeorology and Monitoring of the Natural Environment: "What Is Monitoring?"]

[Text] The time when environmental pollution bore a local nature, i.e., was found only in isolated territories, ended 3 to 4 decades ago...

The consequences of global pollution of the environment may be critical—changing the climate of the planet, and altering the state of its ozonosphere, which in turn results in a threat inevitably to the Earth's entire biosphere. Recognizing the full importance of environmental protection programs, the party and the Soviet government are pursuing a course to insure the future development of such programs. Considerable attention was focussed upon questions relating to the protection of the natural environment during the 25th CPSU Congress, and in a number of Central Committee Decrees as well as governmental decrees. Article 18 of the USSR Constitution reinforces the need for environmental protection and for scientifically based, rational use of natural resources, and for maintaining the cleanliness of the entire natural environment surrounding us.

The draft "Basic Directions for the Economic and Social Development of the USSR for 1981—1985 and the Period to 1990" states: "In the field of natural and technical sciences, efforts will be concentrated toward the resolution of the following most important problems: ...increased effectiveness of programs in the field of environmental protection, rational use of biosphere resources, of the World ocean and sea shelf resources, and perfecting forecasting methods for weather and other natural phenomena". This once again emphasizes the practical, interested, and rational attitude of our country toward nature. Currently, our administration is involved to a great extent with this problem: during the past year, the administration for hydrometeorological service was reorganized into the administration for hydrometeorological services and monitoring of the natural environment, i.e., our entire operation has been given extreme strategic direction.

Developing an environmental protection strategy requires a comprehensive study of the environment. At the present time, the USSR is implementing monitoring (observation, evaluation, and forecasting system) of man-made pollution of the natural environment. Soviet monitoring is an integral part of the global environmental monitoring system (GENOS), the primary goals of which are—observation

of the planet's biosphere, evaluation of its base (i.e., its initial state), and the observation and forecasting of biospheric changes.

Activating world-wide monitoring will enable a study to be made of the effects of man's economic activities upon the degree and nature of pollution affecting the atmosphere, soil, water, land areas, and the World oceans; the ways in which certain dangerous substances migrate over the planet will be identified, as will the ways in which they undergo transformation and accumulate, their effect upon various biological entities, and effects upon entire economic systems; finally, global monitoring will facilitate establishing the possible effects of harmful admixtures upon the Earth's climate, the condition of its ozonosphere, and the like. It is absolutely obvious that the resolution of such great tasks is possible only when based upon international cooperation.

Currently, USSR ministries and departments are obliged to coordinate with the State Committee for Hydrometeorology (Goskondromet) by presenting location layouts for industrial and other types of facilities, and drafts for the construction of such sites. We have been charged with the analytical development of statistical reporting relating to protecting the atmosphere from pollution, preparation of routine and emergency data on the condition of the environment, and of predicted changes and reasons for those changes. All this information is provided to the USSR Council of Ministers. In four cities of the republic, Frunze, Osha, Tokmak, and Kara-Balta, atmospheric pollution is regularly monitored for the effects of industrial enterprise emissions, automobile exhaust, dust, and other products of man-made origin. Recently, a group was established to forecast air pollution level based upon predicted meteorological conditions. Particularly, then, when prevailing weather conditions indicate a stagnation of air pollution impurities, a temporary reduction of industrial emissions is in order, in accordance with the requirements of the so-called local agreements concluded among the UZRS and the enterprises. While such work has just begun, it exhibits great promise. The chief thing is that it satisfies the requirements for the economic and social development of our country.

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## LAKE SEVAN POLLUTION PROBLEMS DISCUSSED

Yerevan KOMMUNIST in Russian 4 Jan 81 p 2

[Article by A. Bagdasaryan, corresponding member of the Armenian SSR Academy of Sciences: "Experiment Purity"]

[Text] Scientists from Soviet Armenia greeted with a great sense of satisfaction the draft for Basic Areas of Development of the Country for the Five-Year Plan and the Period to 1990. The greatness and grandiose nature of the plans are inspiring, and generate a sense of being prepared unceasingly. The long-range plans for development which are envisaged for the economy, science, and culture constitute a specific program for our work.

Serious tasks have been levied upon Soviet science relating to problems of environmental protection. The draft specifically emphasizes the necessity for strengthening protection of water sources against run-off. Work is to be continued to protect and rationally utilize unique natural complexes...

For the Armenian SSR, the blue pearl Lake Sevan is a unique complex.

The rapid development of the economy and the growth of population in Soviet Armenia have led to constant increases in requirements for clean water, and at the same time has resulted in increased volumes of polluted drainage and effluents. In this respect, the protection of water resources and the rational use of those resources in the republic have assumed particular significance.

On 28 September 1978, a most important decree was adopted by the CPSU Central Committee and the USSR Council of Ministers "Programs to Protect and Rationally Utilize Natural Resources of Lake Sevan". It envisages a complex of programs to increase water resource reserves and to improve the ecological condition of the Sevan Basin. The theme throughout this document is a concern for eliminating sources of pollution in the lake, and maintaining the purity of the water.

The programs designed to increase the incoming segment of the lake's water balance include also the recommendation of the Institute of Applied Geophysics, USSR State Committee for Hydrometeorology and Environmental Monitoring concerning regular, beginning in 1980, experimental work relating to the artificial increasing of atmospheric precipitation in the lake's basin.

We consider it necessary to express our misgivings regarding the benign nature of

of the proposed programs for artificially influencing the lake to increase atmospheric precipitation.

The experience from the century of the scientific-technological revolution clearly demonstrates that the effect of people without the knowledge of and consideration for developmental laws of the ecosystem is accompanied by negative consequences, which are capable of disrupting the dynamic equilibrium and the biosphere and to inflict irreparable harm upon the environment. Consequently, before we proceed to major programs impacting upon nature, we must intelligently study the peculiarities of a given regions geosphere, we must forecast or predict possible consequences, and then, and only then should be commence implementing industrial experiences.

The program recommended by the Institute unsatisfactorily elucidates the problems of natural-meteorological conditions of the Sevan. The physical processes of cloud and precipitation formation in the Lake Sevan basin were virtually unstudied.

The first relatively broad discussion of the program was undertaken on 19 October 1978, in the presidium of the republican Academy of Sciences. At this meeting, project directors were unable to provide convincing bases for the expected quantitative changes in the water of the lake, and also of the ecological harmlessness of the experiments. The authors affirmatively alluded to the fact that the basin is an ideal testing ground for conducting this type of experiments...

In this respect, it should be noted that to restore the disrupted equilibrium of the lake, by state resolution by the republic, the "Sevan" National Park was established, with nature-preservation and recreational functions. The water areas and associated landscapes of the basin were declared a preserve zone, where by law such types of experiments are prohibited.

The idea of artificially influencing the weather and climatic changes is not novel. However, its practical application, particularly with regard to precipitation stimulation, does not currently exist anywhere. During the sixties, similar work was carried out in Australia, however it was quickly curtailed due to the inability to evaluate the effect and scope of economic effectiveness.

The Worldwide Meteorological Organization points out the illegality of conducting such industrial experiments in its declaration, which states: "Influencing the weather is still in the research stage, therefore the conducting of work requires a thorough preliminary study of specific experiment conditions and the recognition of the fact that the final results may not always be positive".

We do not oppose experiments to achieve artificial precipitation. They should be conducted, and can be conducted, but only after thorough consideration is given to natural conditions and to eliminating the risk of inflicting ecological harm as well as economic damage. From this standpoint, Lake Sevan, with its biospheric structure considerably disrupted as a future source of drinking water, is not a suitable testing ground for the experiment.

The Sevan--virtually lacking in outlets, would sustain damage from harmful concentrations of the substances utilized in the experiments, which would accumulate. Finally, landscape-geochemical research is unknown in Armenia to determine movement routes

and conversion of these substances, and also their harmlessness. It must be pointed also, that the program itself justifiably notes the possibility of polluting the lake's waters and damaging its biological resources.

Geophysicists point to the possibility of obtaining 100 million cubic meters of additional water per year. However, calculations made in the Department of Geography indicate that in the optimum situation, the quantity of water would not exceed 35 million cubic meters. What is more, in the work program, there are no economic projections, and the cost of the water thus obtained remains unknown.

A legitimate question arises: should the risk be taken, should the Lake Sevan basin be subjected over an extended period to artificial influence, fraught with both direct and indirect negative consequences?

We suggest that the arguments cited provide a basis for stating that it is yet premature to carry out industrial experiments. It would be rational to envisage in the 11th Five-Year Plan comprehensive research of the atmospheric and climatic physics of the Lake Sevan basin, research conducted mutually by the Institute for Applied Geophysics, and only after having the results, to decide the question of the necessity for conducting experiments.

I consider it expedient in the draft on Basic Areas for Economic and Social Development of the USSR for 1981-1985 and for the period to 1990 to insert a point on the responsibility of scientists to preserve the biosphere, to improve the level of research of the country's water basins. Not a single lake or body of water must become a testing ground for experiments with detailed scientific foundations lacking.

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CSO: 5000



# ECOSYSTEM APPROACH RECOMMENDED FOR PROTECTION OF BIOSPHERE

Moscow PRAVDA in Russian 30 Nov 80 p 3

[Article by E. Slepyan, doctor of biological sciences: "Guarding the Earth's Biosphere"]

[Text] With the emergence of human civilization, a new factor appeared that affected the fate of living nature. It reached enormous force in the current century, and especially in recent years. Today in many cases, for example, in extraction of minerals, creation of new pipelines, construction of large cities and reservoirs, and conducting land reclamation and irrigation measures on large territories, human activity is comparable to geological. As a result, in a number of places, representatives of the flora and fauna of the planet are threatened.

Emissions of industrial enterprises and engines, and the careless use of fertilizers and pesticides play a special role. These chemical contaminants enter from the air, soil and water into the plants and animals. Many substances that are in the tissues and cells are not completely broken down and are not removed, but are preserved there and even accumulate. It is impossible not to notice the danger of external and internal contamination of plants, especially the perennials. Weakened, they lose the capacity to fulfill their most important function, to be the "green lungs" of the planet and participate in the cycle of substances in nature.

Yet another important circumstance needs attention. Not only those damages are dangerous that entail sickness of the affected organisms themselves, but also those that induce hereditary diseases, i.e., harm the progeny. The organisms and their communities are generally under the influence of many harmful agents. These are chemical pollutants, deviations from the normal in the electromagnetic field near power transmission lines, disruption in the thermal patterns of the air, soil and water in the operating region of power engineering units, and noise.

It is the urgent problem of today's science to make a differential analysis of them and establish the unique effect. But it is no less important to know what their total effect is, not only on the individual organism, but on whole biological complexes.

We have the basis for this comprehensive approach in our country. It is associated with the work of V. V. Dokuchayev, V. I. Vernadskiy, V. N. Sukachev and many other prominent figures in domestic natural science.



But currently the main environmental protection work is oriented on higher plants, in the first place, flowering, and on vertebrate animals. However, in order to protect nature it is quite necessary to worry about bacteria, fungi, algae and invertebrates, i.e., about all organisms inhabiting the earth, its waters and dry land. It is impossible to solve the problem of their protection with an individual approach. The only more or less reliable way is to preserve the ecosystems, i.e., the communities of organisms and the territory they occupy with its air basin, soils and natural waters.

However complicated this approach is, it is the one we must arm ourselves with. The plants and animals on the path to extinction can be preserved in botanical gardens and zoos outside their place of natural dispersion. Special techniques for preserving the embryonal plasma, storing seeds, growing cells and tissues isolated from the organism, and lengthy freezing without loss of viability all help. You cannot guard an ecosystem in a test tube.

In order to solve the problem we need, first, to know the laws governing the development of ecosystems under normal conditions of their existence, without disruptions caused by human activity. Second, we need systematic and multisided research on the laws governing damage to ecological systems, as well as the features of their natural and artificial restoration. The results of this research will become the most important property of mankind in our time and the near future, since they will be the basis for a strategy to preserve the life cycle on earth.

Of course, the laws governing the disruption and restoration of the ecosystems are so complicated, while the theoretical principles and practical analytical techniques are so specific that great efforts are required by scientists from different fields of knowledge. This work is actually underway at the junctions of life sciences and earth sciences. A lot that is useful can be taken from the related branches. For example, the experience of general and comparative pathology is convincing that many complex disease phenomena that occur in the body are often more successfully diagnosed from the characteristic combinations of disorders called syndromes. Such an approach is a reliable tool in protecting ecosystems as well.

Syndrome analysis makes it possible, in particular, to overcome the stereotypes in thinking, and this means the road is open to new principles and methods of research and the narrow departmental approach to studying ecosystems is prevented. It is fraught with errors and excesses.

For example, look at the results of observations by a number of Soviet and foreign specialists. Landscaping of dumps formed, in particular, during extraction of asbestos, refractory clays and foundry sand is an important task. It turned out, however, that the plants grown on these dumps have a content of chrome, titanium, cobalt and nickel that is ten times greater than the normal. Caution is needed in grazing domestic animals here and using the plants for other needs. These situations can be avoided if those plants are chosen for the landscaping that do not accumulate harmful substances. For this purpose it is necessary to take into account the data of soil science, soil chemistry, physiology and biochemistry of plants.

I will cite other cases of ecologically not well-planned actions. In order to secure the dumps in the dry steppes of Kazakhstan, hydromixtures with bitumen emulsion of dark color were recommended and used. Practice confirmed the capacity of the emulsions to withstand erosion. However, they heat up so much that the

plant seeds die. They did not succeed in solving the problem of long-term securing of the dumps by this method.

Heather is a good pasture feed. Artificial burning is used to stimulate its maturing. The heather grows faster. But during burning the ground is destroyed, the surface run-off increases, and in the end this results in accelerated erosion.

Regulation of the Suloti River was attempted in the Moscow Oblast. For this purpose a partial drainage of lake Zabolotskoye was done, resulting in the death of a valuable connate habitat of the cladophora alga. The swamp, however, was preserved.

Use of a number of chemicals in the United States to combat fire ants at first yielded a positive result, but later resulted in poisoning of cows, and increase in the population of ants.

As we see, in order to correctly plan the use of nature, environmental protection and environmental restoration measures, it is necessary to approach the ecosystems as a whole.

Monitoring, the systematic collection and analysis of information about living organisms and their habitat necessary for an ecological diagnosis and prediction serves as the observation of their state in our country and in many other states. This is an important basis for predicting the fate of the ecosystems and for timely environmental protection activity. It appears that the matter would be greatly helped by the use of syndrome analysis. This would permit prevention of undercalculation of some disorders and excessive attention to others.

An important problem of science is to restore damaged ecosystems. The renewal of a forest is one of the most complicated natural processes linked to the mutual adaptation of thousands of types of organisms, from the protozoa to the mammals. It is impossible to count on comprehensive success in growing the forest if one approaches it from only forestry aspects. It is necessary to prevent its damage from pests and diseases, to prevent overrunning with weeds, to follow the fertility of the forest soils, and promote its settling with characteristic animals.

Industrial progress makes it necessary for mankind to stabilize the biosphere under the influence of the ever increasing number of cities, industries and transportation lines. This can be attained by several means, that it goes without saying are important to combine with each other. The most efficient and effective of them is to breed plants and animals by selection, to increase their resistance with the help of special preparations, and finally, what is the most promising, to replace the unstable organisms and ecosystems living in the territory damaged by the effect of harmful factors, with ecologically equivalent, resistant organisms and ecosystems.

All of these directions are being worked out very actively. The first advances have already been made in selecting the plants that are resistant to air contaminants. There are significant achievements in the area of creating and using preparations to protect plants from heat blights and excessive dessication. Definite advances have been made in replacing the unstable organisms with stable. A graphic example is the selection of trees and bushes for transport roads and industrial areas. The problem of equivalent replacement of the ecosystems is complicated. However, there are grounds to assume that it will be resolved.

It should be stressed that questions of increasing the resistance of the biosphere to the effect of developing industry and the rising urbanization are directly and indirectly linked to the problem of controllable evolution of organisms and ecosystems. If man wants to preserve the living shell of earth, he needs to know how and in what manner to direct the evolution of both to the side that is necessary for him. Specific needs constantly arise, for example, in land reclamation and irrigation.

Preservation of nature and giving it the greatest possible resistance to factors is a necessary condition for further progress of human society. Its fulfillment is an important task of our and subsequent generations. It can only be solved with a systems and comprehensive approach, the unification of potentialities and achievements of all classic and new fields of knowledge. The most urgent are those that cover the establishment of laws governing the disorder and restoration of organisms and ecosystems. The time has come to take the necessary organizational measures to strengthen them and intensively develop them.

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CSO: 5000

## NATURE PRESERVATION PROGRAMS IN AZERBAIJAN

Baku VYSHKA in Russian 28 Dec 80 p 2

[Article by E. Mamedova, Deputy Chief, Administration for State Preserves and Hunting - Game Farms, State Committee, Azerbaijan SSR, for Forestry Industry: "Nature—Protect and Augment It"]

[Text] The last quarter century has increasingly activated the effect of man upon the environment. The fact is, the scientific-technological revolution, creating a great leap in the development of production capabilities, demanded a broader use of natural resources. That is why today the Leninist bidding to protect and augment our natural resources has acquired special significance. Differing from many European and American capitalist governments, our country's planned national economy and concentration of production means in the hands of the people provide for a combination of concern for steady growth of production with a concern for preserving nature. Vivid evidence of this is provided by the widely discussed CPSU Central Committee (CC) draft for the 26th CPSU Congress, "Primary Areas For Economic and Social Development of the USSR for 1981-1985 and for the Period to 1990", one section of which is especially devoted to various pertinent questions pertaining to the protection of nature and the environment.

I should note that a great deal has been done and is being done in this respect in the republic. In only the Tenth Five-Year Plan, we organized two new preserves, and brought their total to 10. During the Eleventh Five-Year Plan, five additional new ones will be added: Ordubad, Ismailly, Prikurinsk, Tutgunak, and Stepnoy. For the first time, three new national natural parks, Talyshskiy, Geygel'skiy, and Shakhdag'skiy, will appear on the map of the Azerbaydzhan SSR map...

There is no argument, the organization of new preserve territories and of national parks is a serious question, a responsible matter associated with many, many difficulties. It is a matter which is needed, interesting, and valuable, I think, in all respects. It is obvious that today we must consider a great deal, particularly regarding highly-qualified personnel cadre for the new preserves—inspectors, hunt-masters, who, unfortunately, are not being trained anywhere. Concurrently, it would not impede matters if concern were displayed regarding the appropriate material-technical base for the new preserves, which, alas, leave a great deal to be desired in the old ones. To conduct scientific work and research as noted in the draft, "of natural systems and sites for the purpose of developing recommendations for the rational use of national resources", we will require a rather substantial detachment of scientists—zoologists, botanists, and foresters.



We must re-examine a great deal, weigh much, and borrow elsewhere during the process of organizing new natural institutions as national parks. The latter, if I understand the matter, are not only scenic attractions, high mountains, rushing rivers, gorges—are not just exotic beasts and birds, but tens of comfortable, high-mountain huts and shelters, with all camping conveniences, hundreds of convenient, good condition trails, cableways over gorges and passes, experienced guides—tour conductors, and possibly hunting and fishing in certain areas.

Having thoroughly familiarized myself with the CPSU CC draft for the 26th Party Congress, I would like to say a few words regarding my thoughts and considerations relating to a problem which we have not yet solved; that is the place of the Administration for State Preserves and Hunting - Game Farms of the State Committee of the Azerbaijan SSR for the Forestry Industry in the overall system of nature protection. At little less than a year ago, the Azerbaijan State Committee for the Preservation of Nature, relieved, in its opinion, of "organization functions not relative to its organization" and to improve its exclusively nature preservation activities (monitoring the natural environment), transferred our administration to the Azerbaijan SSR State Committee for Forestry. In the process of this reorganization, however, the Azerbaijan SSR State Committee for Nature Preservation reserved unto itself precisely such "exclusively organizational functions and tasks" in the field of game farming such as distribution of areas, issuing of hunting licenses, establishing standards and periods for shooting, compiling current and long-range plans, and the like. This, you will note, is not involved with either the preservation of game farms, or with breeding of game-industrial animals. It is clear that such a situation is unacceptable, for, as experience demonstrates, it has a ruinous effect upon the fate of our game farming. And not only the game farming; it affects the entire process of balanced increases in the population of wild animals and fowl in nature. Why? Because as a rule, our game farms border with preserves and game-preserves. Both birds and animals constantly migrate, and re-locate at times in large numbers from one territory to another. In a word, the Administration for State Preserves and Game Farms must, not in words only, but in actuality be allowed those exclusive relative functions and rights. In my view, we would not be hindered by the examples set by many of our republics—the Ukraine, Georgia, Armenia, Latvia, and others—and re-organize our administration into an independent main administration, involved with game-preserves and game farms. Another thing: I consider it to be expedient to insert the following revision in the seventh paragraph of Section 9 of the draft, "Preservation of Nature": after the words "implement programs for balanced increases in the population of wild animals" to add: "in state preserves, game-preserves and game farms", further by text. The paragraph would end with the sentence: "All this work would be conducted in a comprehensive manner, on a high qualitative level".

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# LACK OF CONTROL BLAMED FOR ALUMINA PLANT POLLUTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Dec 80 p 2

[Article by Ye. Topolevskiy, brigade foreman of the alumina plant: "The Stacks Are Still Smoking"]

[Text] We recently triumphantly marked the decade for the beginning of line production of the Achinsk alumina. There were speeches, applause, certificates, only the joy of a holiday was not in the soul. What was there to be happy about? During the entire time we did not reach the planned marks. Since the beginning of the year we were in debt for tens of thousands of tons of alumina, and hundreds of thousands of tons of cement. In no way can we "stretch" the plan for output of calcined soda.

It cannot be said that we do not have our share of attention and help from the ministry, all-union production association "Soyuzalyuminiy," and the kray organizations. We make many sensible directions aimed at mastering the rated outputs at the plant. What is the problem? Pondering this question, I come to the following conclusion more often: it is necessary to have stricter control and check on the execution of the adopted decisions.

I have been working for a long time at the agglomeration shop of the plant. Since then our equipment has improved significantly, and the reliability of the rotating furnaces has increased. But there is probably no conference, meeting or assembly where the agglomeration workers do not complain about the poor operation of the equipment, or the fact that the technology for producing alumina from nephelite ore has not yet been definitively worked out. For example, immediately after repair on my furnace I receive 102 tons of product per hour, and at the end of the furnace run, 80-90 tons.

In answer to the claims of the workers, there are assurances for the tenth time that measures will be taken. They could have been taken long ago, back when the first experimental furnace was started up. Take for example, protection of the environment from pollution. It is impossible to get lost in Achinsk. There is an excellent landmark, the smoking stacks of our plant. The struggle for clean air is not only a struggle with inefficiency. By my calculations, we undersupply almost as much cement as flies into the stack.

No, we are not sitting with folded hands. The plant spent millions of rubles to perfect the system of gas purification, and has created a specialized section "Energo-tsvetmetgazoochistki." It helped to significantly improve the situation. But all



of this has little effect since it was not reinforced with the proper monitoring system.

For example, to reduce the dust content and gas content, very good measures were written into the long-term complex plan for development of the plant collective for 1976-1980. Last year the realization of this plan was checked, and it turned out that only 18 out of 30 measures had been fulfilled. An order was immediately issued by the USSR Ministry of Nonferrous Metallurgy "On Additional Measures to Strengthen Environmental Protection and Improve the Use of Natural Resources" which instructed the plant to develop and by 1 September 1979 present measures to introduce low-waste technological processes. The material that was sent to the ministry was so "crude" that it was returned for additional work.

When the colleagues of TsNOTtsvetmet [Center for Scientific Organization of Labor and Control of Production in Nonferrous Metallurgy] in several months checked the plant for control and execution of the ministry documents, they were forced to state that "at the moment of the check, the given materials had not been prepared and had not been presented again to the high organization." The question of work for environmental protection was examined by the plant party committee in the end. And the stacks? They smoke as before.

We can be principled and persistent in achieving the goal. I recall how we successively achieved the decree of the party gorkom "On Work of the Party Organization of the Achinsk Alumina Plant to Reinforce the Party Discipline and Increase the Leading Role of the Communists." Then the party committee meeting spoke seriously with the shop heads Yu. Gaydamakin and F. Metelkin. The latter were even reprimanded. The shop heads understood that they were answering not only for the equipment and the plan, but also for the people.

Why do we nevertheless bring one matter to completion, while others we abandon half way through? We do not yet have a clear system of monitoring and verification of the execution.

When I became acquainted with the decree of the CPSU Central Committee "On the State of Monitoring and Verification of Execution in the Ministry of the Petroleum Refining and Petrochemical Industry of the USSR," then I was surprised. This was written about us and our ministry! The decree criticizes the facts where the orders and instructions "from above" are delayed and have a general nature, poorly correlating with the potentials of the enterprises. We have such special cases too.

Deputy minister N. Chepelenko in letter No NCh-5257/40 ordered our plant to send suggestions for the draft of the branch plan for development of science and technology before 25 April of last year. But we received the actual letter on 25 April. For example, the ministry transportation administration required data on the use of equipment on loading-unloading operations before 15 February 1979. This information arrived at the association a day before the date due. Does the USSR Ministry of Nonferrous Metallurgy really not know how efficiency of delivering decisions influences their execution?

"Strength and success of monitoring lie in its mass nature, objectivity, and broad publicity..." the decree of the CPSU Central Committee states. In my opinion, we have achieved the first positive results in precisely this direction. The large-circulation newspaper of the plant "At Achinsk Alumina," and the editorial staff

of the radio broadcasting station keep the main problems of production development under steady monitoring. The "Dikotfon" system was developed quite recently. Now anyone can call a well-known number and ask any question. It is recorded by magnetic tape and the answer is given in several days in the large-edition newspaper, in the radio broadcast, or in the visual newspaper. The "Diktofon" system was fitting with the spirit of the association toilers.

Preparing for a worthy meeting of the 26th Party Congress, the collective of our shop took it upon themselves to reconstruct all the agglomeration furnaces for the remarkable event. I am obliged to bring the output of my furnace to the planned mark by the day the congress opens. I am taking this decision under my own personal control.

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# ELIMINATION OF DUMPS AND RECYCLING OF MATERIAL RECOMMENDED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jan 81 p 2

[Article by Ya. Ugryumov, engineer-economist: "How Long Will the Dumps Exist?"]

[Text] Dumps are rising up in every mining settlement. They have entered the songs, canvases of the artists like special lyrical details. But when you become more familiar with them you understand that there is nothing lyrical here. Those who live near understand this especially.

Many, many residents of Donetsk enter the "sphere of influence" of the dumps. There are 128 of them here, of which 52 are active. Two-thirds of these 52 burn, continue to smoke, and have long been out of operation. All it needs is a wind to start blowing and a whole "bouquet" of unpleasantnesses fall on the neighborhood, smoke, gases, fine dust and soot. Add to this the tendency of the dumps to ignite themselves...

The environmental protection society cites data for the capital of Donbass that force one to think: is it not time to take dumps seriously? For many decades, up to 3 million cubic meters of rock have been dumped in each of them. If they were all made into a common mountain, its volume would exceed 200 million cubic meters! This is not some kind of "rock mass" as it is called in the official documents, but an excellent filler and raw material for producing construction materials.

They deprive the city of a million of large territories totalling over 200 hectares.

The terms "elimination of dumps" and "recultivation" flash in the speeches of the important workers of the Ukrainian SSR Ministry of the Coal Industry, the associations "Donetskugol'," "Donetskugleobogashcheniye," and other owners of dumps. It goes without saying that this should be done, but by themselves they have not yet lifted the ban on construction in the "sanitary zone." Other measures are needed.

Dumps are the result of primitive technology, a trace of that distant time when coal was taken at any price. Many decades and enormous resources are needed for their universal elimination. Half-measures will not help here. The local press reports with praise that the money allocated for environmental protection is spent by the Donetsk coal workers for "terracing extinct dumps" and their "landscaping," planning for the future creation there of "spiral paths," "landscapes" and "vast squares with attractions." "Ideas" are advanced for building at the dumps parking lots, water reserve tanks, restaurants, bars, panoramas and flower gardens.

But it is known that the removal (hauling away) of dumps is the most effective in both economy and in its final results. One can utilize the raw material stored in them and use the areas wisely, without an accidental match, in the framework of the general plan for city development. The main purpose is to sanitize the atmosphere and try to radically eliminate the foci of pollution.

"Upgrading" and even "partial recultivation" as practice has shown, are not very effective. Over 2 years ago, for example, the old rock dump at the Palace of Athletics at Kalinovka was terraced. What happened? Although several tens of thousands of rubles were spent, several months later it became the center of erosion, deep grooves, loose ground and the terraces washed away. The expenditures were half wasted, and a lot of work and resources were required for the next terracing and subsequent maintenance.

The same occurs at many other dumps. It is indisputable that it is impossible to immediately enter the dumps among the "landscaped" the same year that young trees, bushes and grass are planted, or as "recultivated" land among the finished capital investments. This is an ordinary "incomplete project!" A good dozen years are needed for the post-planting maintenance of the plants and replacement of the dead ones. Even the 100-year-old dumps of the "Tsentral'no-Zavodskaya" mine that have been considered "landscaped" since 1950-1954 still do not have any influence on the ecology.

The residents of a dozen houses on Universitetskaya Ulitsa celebrated a unique anniversary. Fifteen years ago a small dump of the former "Kamenka" mine was removed here, and a house for 1,600 residents was built on the empty spot. Removal of 330,000 cubic meters of rock cost 1 ruble 97 kopeks per cubic meter. It is only a pity that this good experience remained in the singular. Moreover, according to the general plan of Donetsk designed for several decades, removal of only 19 dumps is planned.

It is time to require the coal workers, coal enrichers, coke chemists and workers of the enterprises for production of construction materials to answer for their manner of fulfilling the decisions of the 25th CPSU Congress on the "maximum recovery of wastes." The more so since not only "Donetskugol'," but also the environmental protection section of the Ukrainian SSR Ministry of the Coal Industry erroneously consider the burnt mining rock to be absolutely unsuitable for further use.

At the same time, our closest neighbor, "Rostovugol'," does not organize environmental work in the same way. They have completely halted pouring rock onto the self-igniting dumps. The people of Rostov recently eliminated 10 (and we have 1!) dumps and extinguished four. Today they are hauling rock away from three old dumps and are extinguishing another six. They have recultivated, and what is especially important, have transferred to new land users 270 (!) sections. "Rostovugol'" had long ago and successfully mastered the output of concrete blocks, brick and liquid glass from mining scorched rock on modern equipment, as well as sidewalk, ceramic floor tiles and facing tiles, and ceramic items.

By the way, the rock of our coal enriching plants, according to the developments of the PromstroyNIIproyekt [All-Union Planning and Scientific Research Institute of Construction], can be used, in particular, for light porous fillers and for producing clinker. It is also suitable for backfilling to strengthen mine shafts.

The Yasinovka by-product coke plant of the Ukrainian SSR Ministry of Ferrous Metallurgy in Makeyevka has shown the coal miners a good example that deserves imitation. Each year it sells 300,000 tons of rock of its coal enriching plant to the enterprises of the construction industry of the Khar'kovskaya, Zaporozhskaya and Sumskaya Oblasts for brick manufacture. The enterprise receives 30 kopecks of profit for every ton of rock it sells.

Our "Donetskugleobogashcheniye" at its over two dozen plants has an enormous quantity of the same, annually increasing wastes, but it utilizes them poorly. The enterprises of the Donbass construction industry must share the blame for this with the enrichers.

Now, on the threshold of the 26th CPSU Congress, it seems to me that this problem is already ripe for resolution, not only in Donetsk, but in the entire country. But it has to be solved comprehensively, by joint forces in order to avoid errors of the past years. Enormous sums will again be allocated for protection of the environment in the mining regions. Every ruble must be put to use.

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## BRIEFS

**NOISE ABATEMENT PROGRAM**—An important decision of the Tbilisi City Council of Peoples' Deputies has been complied with: the autotransport enterprise "Tsakavahiri" ("Tsentrsoyuz") has moved from a central main highway to a Tbilisi suburb. This is the tenth "noisy" enterprise to have left the city limits during the current five-year plan. Thus the deputies are fulfilling the electors' directives aimed at combatting noise. At their recommendation, scientists compiled a "noise map", which not only defines noise intensity, but also indicates how to protect against it. It recommends rational approaches to planning and building, screen-barriers, and specialized types of residential buildings with increased sound insulation features. Through the decision of the deputies, not one residential structure is being accepted now without the approval of engineering acoustical specialists. Great significance is now being placed upon landscaping the city. Thus, with the active assistance of the deputies, during the Tenth Five-Year Plan only, more than 300 gardens, squares, parks, and green rest zones have been established. The broad noise abatement program unites other programs as well, programs also proposed by the deputies: laying non-switch lines in railroad sections connecting Tbilisi with the suburbs of Avchala and Gardabani, and introduction into service of new, noiseless busses and trolley-busses. [Text] [Baku VYSHKA in Russian 9 Jan 81 p 3] 8851

**SHALLOWING TREND IN CASPIAN SEA**—A drop in the level of Caspian Sea to a significant degree was caused by its bottom sinking or settling—this the conclusion of certain scientists who concluded geological-geographical research in the spacious territory of southwestern Turkmenia, specifically within Azerbaijan and Georgia. Earlier, the shallowing of the Caspian was associated with the world-wide redistribution of moisture between the World's oceans and land areas, this according to TASS correspondent, director of research, corresponding member of the Turkmen SSR Academy of Sciences, O. Odekov. During the present century, a gradual increase in the level of the World oceans has been observed in the northern hemisphere, along with a concurrent more rapid lowering of the subterranean water table. Reduced run-off into the Caspian is also occurring due to an ever increasing intake of Volga River water for industrial and economic needs. A third factor has now been isolated. [Text] [Baku VYSHKA in Russian 7 Dec 80 p 3] 8851

**MOUNTAIN RESERVOIR**—Yet another manmade sea has come into being, one of the largest in Armenia. Situated high in the mountains, near the Vardenis Range, the Kechutsk Reservoir has filled to a capacity of 24 million cubic meters. More than 50 large and small reservoirs have been built in the republic. With irrigation, virtually all industrial crops, more than one-half of vegetable and one-third grain and fodder crops are currently being cultivated. [Text] [Baku VYSHKA (Gruzinform-Armenpress) in Russian 28 Dec 80 p 2] 8851



**RESTRAINTS FOR THE SEA**—Reducing the destructive force of sea waves will be achieved through a 6.5 kilometer sludge line which has gone into operation in Poti. This line has a capacity for delivering up to 100,000 cubic meters of soil annually to the beach zone. With its introduction in the republic, fulfillment of a broad beach protection program has begun, a program envisaged in a CPSU CC draft for the 26th Party Congress. In just the past ten years, the sea has claimed hundreds of hectares of land near the boundaries of Poti. Poti is now surrounded by water—rivers, canals, and the sea. Under present conditions, the city, whose population continues to significantly grow each year due to newly developed industry, has no way to expand. The task entails not only to restrain the onslaught of the sea, but to force its retreat. Construction of beach-protecting dams provides not only protection of the shore, but to increase its area. In those areas taken from the sea, plans call for the construction of residential areas, sanatoria, and tourist bases during the Eleventh Five-Year Plan. [Text] [Baku VYSHKA in Russian 28 Dec 80 p 2] 8851

**RIGA BAY EXPERIMENT**—In order to determine the sensitivity of plankton to pollutants, Latvian hydrobiologists conducted an unusual experiment. They preferred as laboratory test tubes huge globes made from transparent membrane with a capacity of approximately 1,000 cubic meters. These were installed on floats in Riga Bay and fixed to anchors, numbering several dozen "vessels" filled with sea water. Certain toxic substances in varying concentrations were intentionally introduced, and the reservoirs were maintained for a full month under natural lighting and temperature conditions. The samples taken will establish endurance limits of bacteria, single-cells, and of microscopic algae and crayfish inhabiting the near-shore zone. The experiment was carried out by scientists from the Institute of Biology, Latvian SSR Academy of Sciences, with the assistance of the scientific ship "Dzintaryura". Future research is envisaged using the same method. The program will cover several years. The results obtained will be reflected in recommendations for the protection and rational use of the Baltic Sea's natural resources. [Text] [Riga SOVETSKAYA LATVIYA in Russian 25 Nov 80 p 2] 8851

**SCIENTISTS' CREATIVE PLANS**—The CPSU Central Committee draft states that, proceeding from the economic strategy of the party and the chief task of the Eleventh Five-Year Plan, it is obligatory "to increase protection of nature, agricultural areas, the atmosphere, bodies of water, and the animal and plant world". All this directly impinges upon the activities of our administration's collective of scientific workers. We are now conducting and outlining interesting scientific work, the primary areas of which in the upcoming five-year plan are: study of hydro-meteorological conditions of the Kamchatka shelf and the preparation of a new reference work on the climate of the USSR which will more fully satisfy the oblast's economic requirements. One of the new areas in our scientific research activities is the study and solution of problems relating to mud and land slide dangers in the mountainous areas of Kamchatka, particularly in the Petropavlovsk environs. All of us, the Kamchatka scientists, are inspired by the magnanimous program for economic and social development in the USSR, and with even greater enthusiasm will pursue our scientific research in order to make worthy contributions toward fulfilling the historic plans of the party. [Text] [Moscow KRASNAYA ZVEZDA in Russian 18 Dec 80 p 2] 8951

**COMPREHENSIVE USE OF NATURAL RESOURCES**—The CPSU Central Committee (CC) and the USSR Council of Ministers has reviewed the question relating to comprehensive use of land, water, and fishing resources of the Volga-Akhtubinsk Floodplain and the Volga River Delta in Astrakhan' oblast and have issued the appropriate decree. As noted in that decree, after the May (1966) CPSU CC Plenum, extensive work was undertaken in the oblast to develop irrigational agriculture, however, the richest earth and water resources are still being insufficiently utilized. The productivity of irrigated lands on a number of farms remains low. Fish industry organizations of the oblast are not providing for the development of the material-technical base for the breeding and increasing of fishing reserves. The CPSU CC and the USSR Council of Ministers have recognized the mandatory implementation during 1981-1985 of a comprehensive program for the utilization of land, water, and fishing resources of the Volga-Akhtubinsk Floodplain and the Volga River Delta in Astrakhan' oblast. It envisages a significant increase in the oblast production of vegetables, melon crops, fodder and rice, and also of fish catches (primarily through the creation of pond farming). The USSR Ministry of Land Reclamation and Water Resources (MINVODKHOZ) has been assigned the tasks of introducing irrigated lands and water-supplied pastures, improvement of the technical condition of existing irrigation systems, and also to build 13 sovkhoses on reclaimed lands. Capital expenditures totalling 585 million rubles are being allocated for land reclamation and agricultural adaptation of those lands. The USSR Ministry of Fishing (MINRYBKHOZ) has been tasked with construction and remodeling fish-farming enterprises and commercial pond farms. Expansion is also earmarked for canning industry capacities, as are elevator volumes, construction of mixed feed mills, greenhouses, and greenhouse combines, and of new berths for the shipment of fruit and vegetable produce. [Text] [Minsk SEL'SKAYA GAZETA in Russian 6 Jan 81 p 3] 8851

**BALTIC POLLUTION**—The geographers have offered the Baltic fishermen an original "compass." The specialists from the department of geographical sciences of the Lithuanian SSR Academy of Scientists with their colleagues from Latvia and Estonia have conducted comprehensive studies of the bottom of the southeast Baltic and defined the zones of its pollution. Bream, flounder and pike perch feed on bottom organisms, therefore the geographers advise that their spawning grounds and concentrations of fish should be looked for where the "pastures" of fish are the cleanest. "Pollutants, substances contaminating the medium, are present not only in the water, but also settle on the bottom," relates corresponding member of the Lithuanian SSR Academy of Sciences, head of the department of geographical sciences, Professor V. Gudyalis. "For a long time, all types of industrial wastes and oil form a sort of second bottom that covers the natural bottom with a film in the zones of the most intensive pollution, and changes the chemical composition of the water. Wherever the concentration of pollutants is especially great, different fish diseases spread and the vegetation disappears. In-house forces are also mobilized to control the pests of the Baltic. When the biochemical equilibrium is disrupted, the activity of certain microorganisms is triggered. The goal of the scientists is to have a good knowledge of this process and to find means to accelerate it, and technical resources for cleaning the ground." [Text] [Vilnius SOVETSKAYA LITVA in Russian 24 Dec 80 p 4] 9035

**OIL SPILL PREVENTION**—The "David Guramishvili" tanker has become a laboratory for operational tests of new instruments to prevent oil pollution of the sea. The set of units was created by the Soviet specialists and will be subsequently installed on all ships of our tanker fleet. [Text] [Moscow IZVESTIYA in Russian 5 Dec 80 p 6] 9035

HELICOPTER POLLUTION DETECTION--The degree of pollution of sea and river water soon will be determined from...a helicopter. The department of physical electronics and optic-electronic instruments of the V. I. Ul'yanov (Lenin) Leningrad Electrical Engineering Institute has made equipment to record water pollution. The operating principle of the unit is simple. A light beam directed vertically downwards by a special sensor is reflected from the water smooth surface. The change in coefficient of light deviation is recorded by a self-recorder and the "suspicious" places are immediately plotted on a chart. The ship oil collectors later instill order in the designated territory. However, in the opinion of the specialists of the fuel and energy department of the Central Scientific Research Institute of the Navy, a dispersion medium can be used to control oil spills. A helicopter is lifted above the oil spill and scatters this special chemical substance. It collects the spread oil into drops that descend to the bottom due to their heaviness. The laboratory institute has already developed several formulas for these dispersion media. [Text] [Moscow VODNYI TRANSPORT in Russian 6 Jan 81 p 4] 9035

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NORDIC COUNCIL STUDIES COOPERATION IN HAZARDOUS WASTE

Helsinki HUFVUDSTADSBLADET in Swedish 22 Jan 81 p 12

[Article by Henri Juva]

[Text] Nyborg, Denmark (FNB)--Nordic cooperation in the disposal of hazardous waste will be intensified as soon as the other Nordic countries, and not just Denmark, get their own hazardous waste facilities.

The Nordic Council is considering a proposal for a joint Nordic facility for inorganic waste from which poisons have been removed. The joint hazardous waste facility would treat waste from which heavy metals, for example, had been removed beforehand.

Denmark has gone the farthest in disposing of hazardous waste. The world's first nationwide facility for treating hazardous waste is operating in Nyborg. Killy Brauer, the facility's manager, reports that of the 60,000 tons of waste received annually by the plant, 500 tons are of such a nature that they cannot be treated.

Just like many Central European countries, Denmark sends that kind of waste on to the FRG, where the waste is stored in abandoned salt mines.

Monitoring

Because legislation is being stiffened in many countries, Folke Aarnio, manager of Finland's Ongelmajäte Corporation, suspects that exports of waste may soon be halted. That is one reason why a study is being made of the possibilities for Nordic cooperation in treating waste that is especially hard to handle. The Danish hazardous waste facility is located next to a food processing plant. Possible harmful effects are monitored a couple of times a year by the country's Ministry of Environment. The local inhabitants have shown some degree of concern over waste disposal. When hazardous waste disposal was begun in Nyborg in 1975, there was no opposition to the activity. The site was chosen from the standpoint of business economics. Nyborg was chosen so that transportation would be as cheap as possible. In addition, there was already an intermunicipal facility for treating petroleum waste in that locality.

Nyborg Mayor Frederik Norgard guesses that a good 95 percent of the city's inhabitants approve of the hazardous waste disposal plant. But there remains a vociferous group of environmentalists. And critical voices were raised when expansion of the facility was being discussed by Nyborg's Municipal Council.



Mayer Norgard says that the hazardous waste facility is not the biggest polluter of the environment in the city. More problems are experienced with the city's five district heating plants.

#### Petroleum Waste

The amount of waste treated in Nyborg has increased steadily from year to year. An exception is petroleum waste, which has declined in quantity and worsened in quality as oil prices have risen. Most of the petroleum treated now is suitable only for fuel.

The hazardous waste facility produces 35 percent of the district heating in Nyborg, which has 18,000 inhabitants.

District heat production is going to be increased to meet half of the city's requirements within a year.

Waste is collected at 23 collection stations. The stations are close together so that industry will not neglect waste disposal on the grounds that it has to be transported too far. In Finland there are plans to set up 12 collection points. Until a year ago, Denmark accepted some of Sweden's hazardous waste. But since the volume of waste was increasing in Denmark itself, the transportation of waste from Sweden was stopped.

#### In Storage

In Sweden the hazardous waste is collected in temporary storage spaces to an even greater extent than it is in Finland. And like Finland, Sweden has no facilities for treating hazardous waste. At one time there was a small and antiquated facility in Lofsta, near Stockholm, but its license expired.

Manager Aarnio points out, "Sweden is a terribly poor example. The problems are much greater there than in Finland. When it comes to deciding on the location of a hazardous waste facility in Sweden, public feeling becomes as agitated as it does in Finland. In Sweden it is the government that will make the decision on where to place the facility, but that decision is still being delayed."

Norway is the country most dependent on Nordic cooperation on hazardous waste. A hazardous waste facility in that country has not even been planned. There are plans in Norway to incinerate some of the hazardous waste in cement kilns, but that does not solve the problems associated with picking a site for the waste that is most difficult to treat.

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# RECOVERY TECHNIQUES TO PREVENT OFFSHORE OIL POLLUTION

Paris LE MONDE in French 17 Feb 81 p 41

[Article by Marc Ambroise-Rendu]

[Text] Stavanger--Three bright red boats, a dark green fjord, snowy hills in the background: It could be a sweet painting. The Norwegian oil slick commandos are refining their techniques, a routine exercise in this country that has never known any real oil catastrophe but that is constantly ready to defend its shores.

The "Norindo," one of those strange platform supply vessels -- short bow, bridge at water level, very powerful engines -- pays out 600 meters of net rolled up on a giant spinner like a fire hose. Weighted down by lead and supported by floats, the net dam is spread, erecting a flexible wall 80 cm high over the waves. Two tugs seize the ends and drag it slowly as if it were an enormous crumb scoop. If there were any oil in the Stavanger fjord, it would be trapped.

Circling by means of its lateral propellers, the "Norindo" stays close to the back of the trap and extends the articulated arms of two aspirators, which rest on the hypothetical slick and begin their work.

Today, they draw nothing but water, but they are designed to skim 150 tons of oil from the sea an hour.

The crews that belong to this tiny antipollution squadron repeat their gestures as seriously as the firemen in France practice putting up the long ladders. They have only to raise their eyes to be convinced of the need for these exercises. A few cable lengths away are the two parts of a platform under construction, the largest in the world. The concrete bases are 180 meters high and weigh 800,000 tons. The tower -- an oil processing plant and housing for 200 workers -- weighs 35,000 tons.

Once placed on the Stratfjord deposit, it will be the point of emergence for 40 wells, which will join the 250 others found in the Norwegian part of the North Sea which are already spewing forth 20 million tons of hydrocarbons a year.

Despite Draconian precautions, every one of these holes could one day cause an oil slick. On the very coast, three refineries treat and then distribute 10 million



tons of oil a year. In the south, an immense petrochemical complex is under construction. Every new discovery, all development of oil resources, increases the risk of minor pollution or major disaster by that much.

In the distribution sector, some 60 accidental spills occur every year. At sea, the first warning came in 1977. At the Ekofisk field, the Bravo platform allowed 12,000 tons of a light oil to leak out. Part of the amount evaporated immediately, some was recovered by suction equipment and the sea had to digest the rest. The Norwegians believe that the accident provided them with an exceptional opportunity. Urged on by the powerful fishermen's pressure group and by public opinion made extremely sensitive to the deterioration of the environment, the government spared no effort.

As early as 1970, a law to prevent pollution by hydrocarbons forced communes to acquire anti-oil slick equipment. The 14 oil companies that operate the Norwegian deposits in the North Sea have been asked to band together in a kind of cooperative, NOFO [expansion unknown]. This organization has purchased, at its own expense, 28 aspirators similar to those we saw at work in the Stavanger roadstead, as well as several kilometers of dams.

If there is a spill, everything is planned: warning system, crisis staff, the opening of equipment depots -- there are 14 spread out along the coast -- and the mobilization of men and ships within 48 hours.

#### Four Years of Research

Norway could count on the combined means of the government, refiners, communes and operators. It would put on the line around the platform in question and along the shore some 100 specially equipped ships and boats (including 24 trawlers under contract and duly indemnified for this civil service), dozens of floating aspirators of all calibers, pumps and equipment carried by helicopter and dozens of kilometers of dams.

One significant detail: Authorities have turned down any chemical treatment of the oil sheets and have chosen instead the systematic recovery of the oil. This option is a great deal more expensive but preserves ocean resources. The fisheries are one of the country's prime economic activities. As for the fish farms, there are already 250 in existence and they are multiplying rapidly.

Maintenance of the anti-oil slick arsenal and manpower training (2,000 municipal employees have received special training) cost nearly 40 million francs a year. That is the picture now, but thought is already being given to the future.

Norway is therefore trying to perfect its methods. A 4-year research program has been given a budget of 40 million francs. Work is going ahead in 20 different directions: the simulation of accidents, oil recovery, tests of the usefulness of dispersants, effectiveness of dams, the cleaning of birds caught in the oil.

All possible means to fight oil slicks are being explored. Nor is the work purely theoretical. In a few weeks, a large-scale exercise with a deliberate oil spill will take place in the North Sea.

Naturally, private firms are not sitting on their hands. Several of them, such as Franck Mohn, Thune-Euraka and Bennex, which have ultra modern plants and which are already using the most advanced techniques, have specialized one of their departments in antipollution equipment. We saw this equipment at work at the Ekofisk field, but also at the time of the "Amoco Cadiz" disaster and in the Gulf of Mexico after the Ixtoc One spill. From 16 to 21 February, during an information week organized in Paris by Norwegian industrialists (Norwegian Export Council, 37 Rue du General Foy, 75008 Paris, Telephone 387-81-90), these companies will try to make their equipment known. Norway does not have only oil; it has ideas as well.

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